

Regional Flood Management Approach to Addressing Climate Change

October 23, 2013



Overview

Climate change and uncertainty

Practicing resiliency and building in flexibility to address climate change in regional flood management planning

System planning and system improvements engineering

Climate Change

Climate change treated as a source of uncertainty in regional flood management planning.

Potential effects of climate change in Central California:

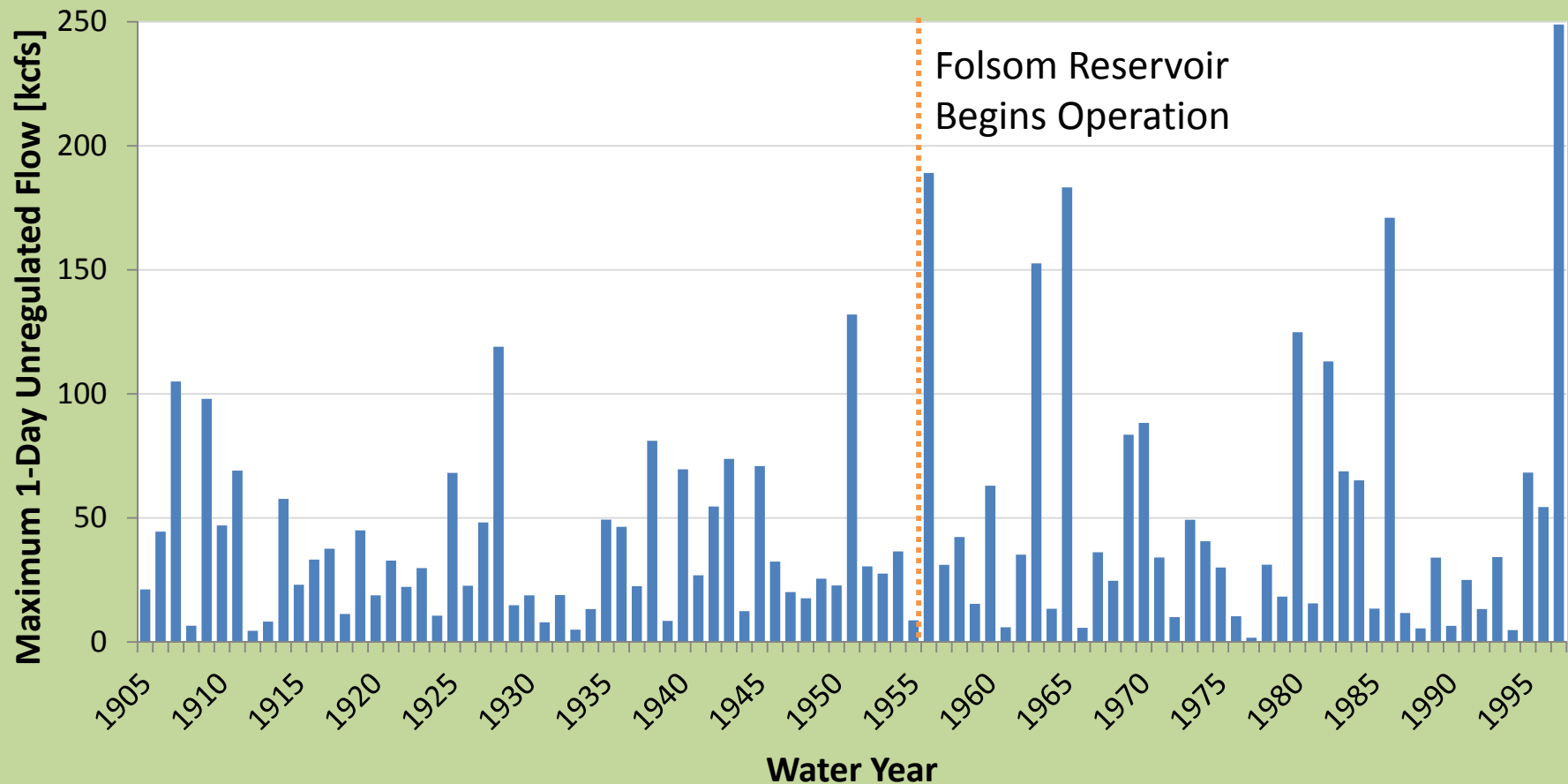
- rise in sea level
- increase in rain vs. snow
- change in intensity and duration of precipitation events

Response:

- Build a flexible, robust system that can adapt to these changes

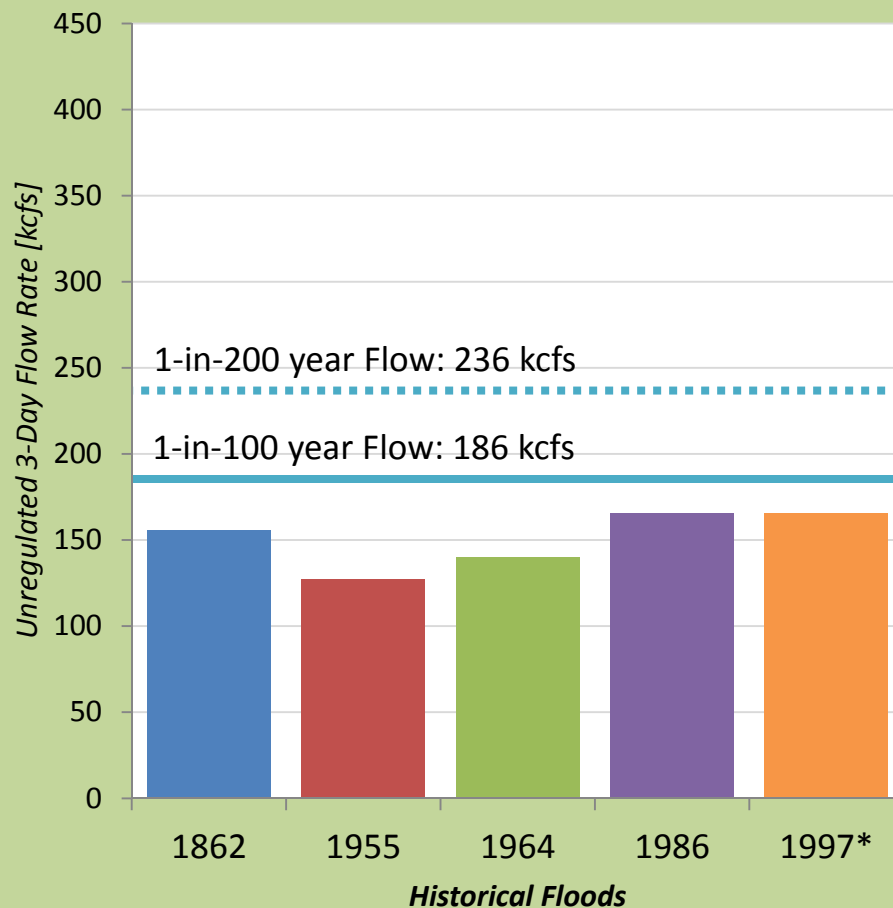
Designing for Climate Change

American River at Fair Oaks



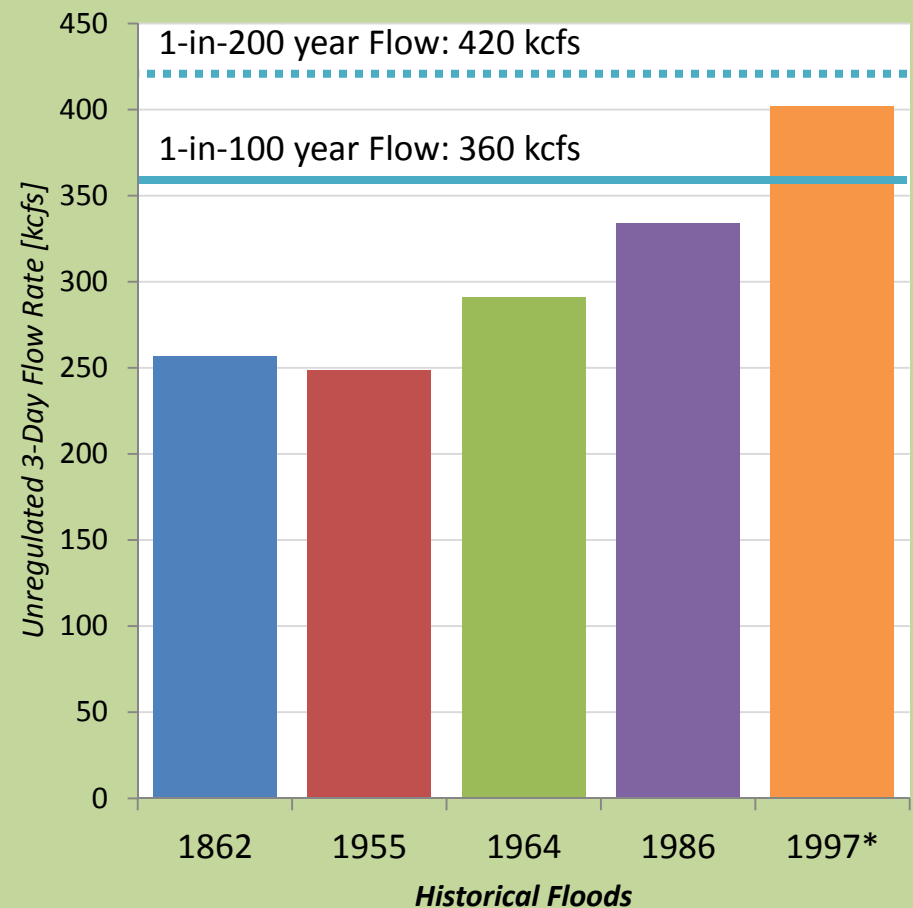
Comparison of Major Historical Flood Events to Hypothetical 1-in-100 & 1-in-200 Year Flows

American River at Fair Oaks



* Flood of Record

Yuba-Feather Confluence



Sources: USACE, 2011 (left) & DWR, 2013 (right)

Practicing Resiliency and Building in Flexibility

Design Existing Urban Levees to meet State Urban Levee Design Criteria (ULDC)

ULDC features that address uncertainty:

- Assumes upstream levees overtop, but do not fail
- Geotechnical design based on water at the top of levee
- Land use policies and real estate acquisition to preserve open space at landside levee toe
- Additional foot added to design elevation

Lower Sacramento River / Delta North Regional Flood Management Plan

System Improvement Objectives:

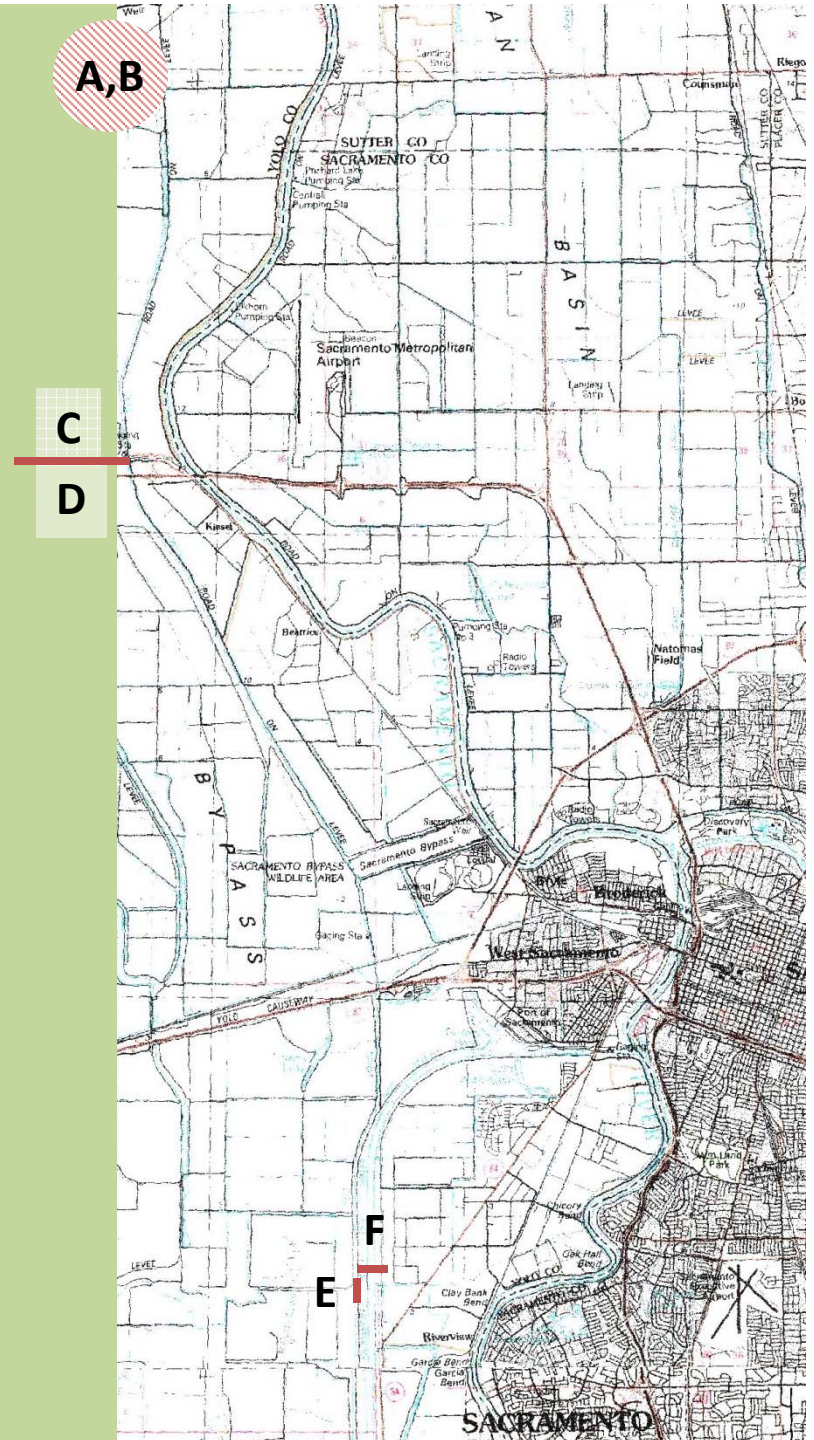
- Decrease water surface elevations in project area
- Provide capacity for ecosystem restoration
- Needs to be done in a way that promotes agricultural sustainability

Improve flood conveyance of the Yolo Bypass
within existing footprint

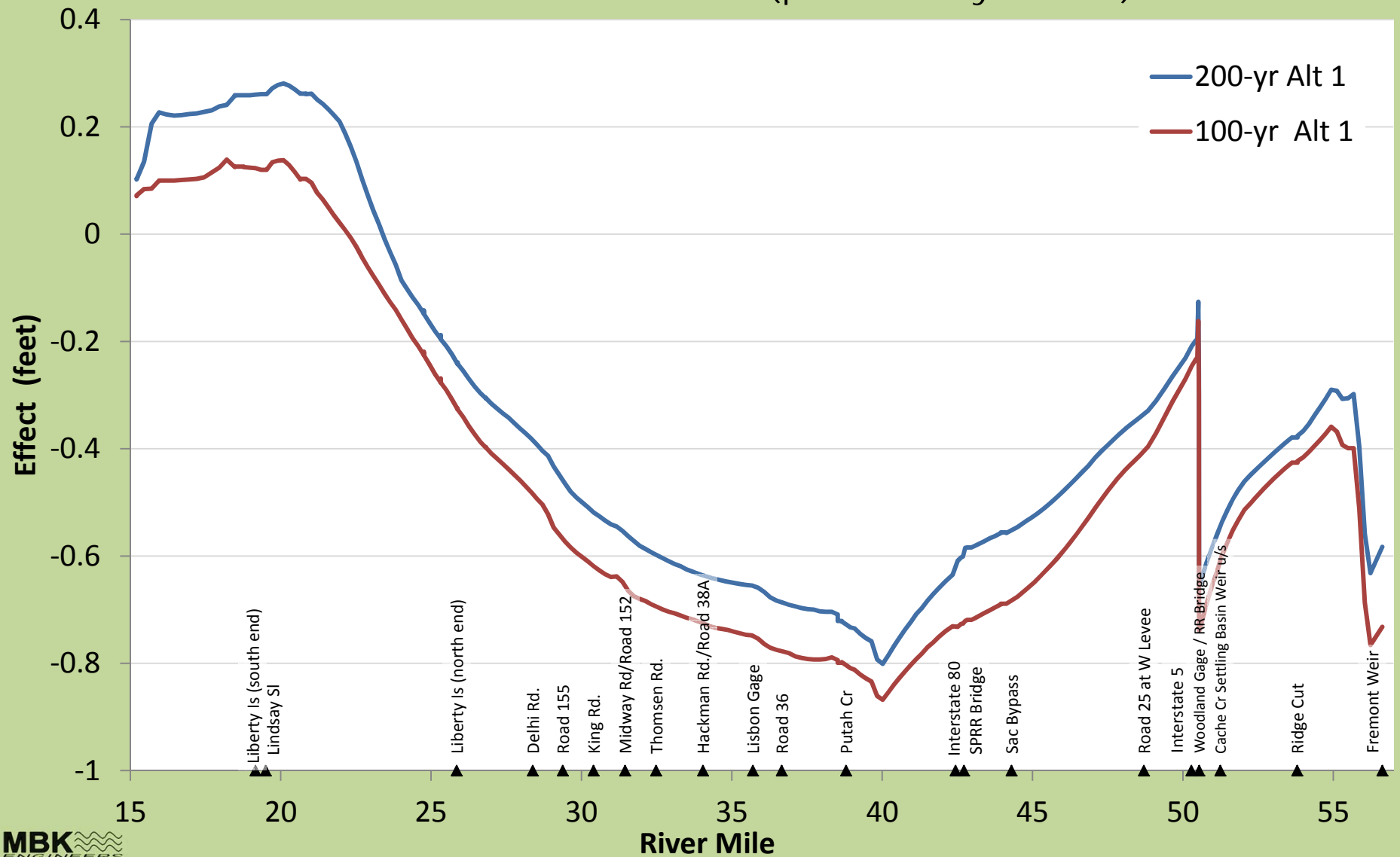
Expansion of Sacramento Bypass

Upper Yolo Bypass Footprint Components

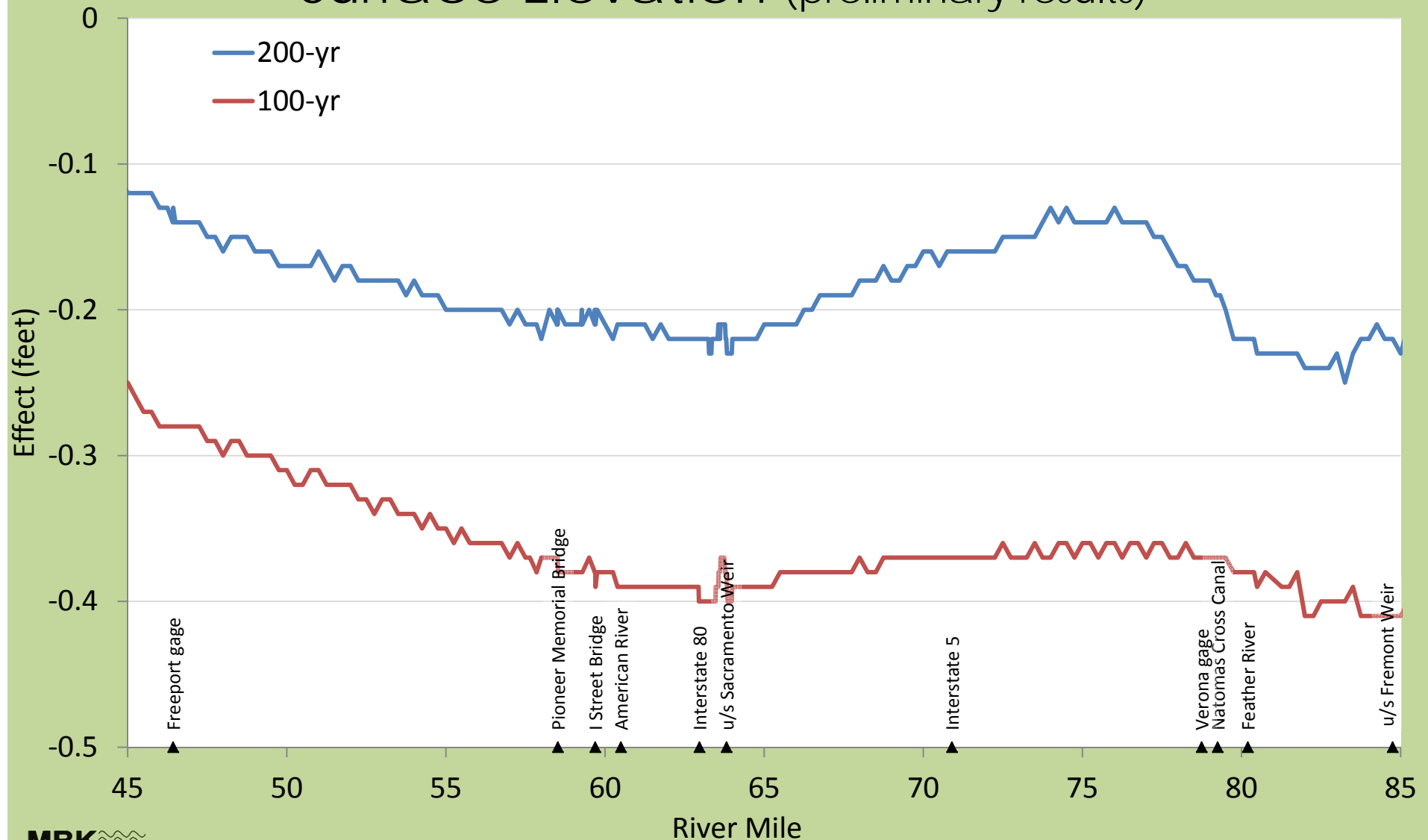
- A. Thin vegetation
- B. Remove spoil mound
- C. Remove Yolo short line railroad bridge
- D. Lower County Road 22
- E. Add weir into Deep Water Ship Channel
- F. Add flood barrier in Deep Water Ship Channel



Effect of Selected Upper Yolo Bypass Footprint Components on Yolo Bypass Maximum Water Surface Elevation (preliminary results)



Effect of Selected Upper Yolo Bypass Footprint Components on Sacramento River Maximum Water Surface Elevation (preliminary results)





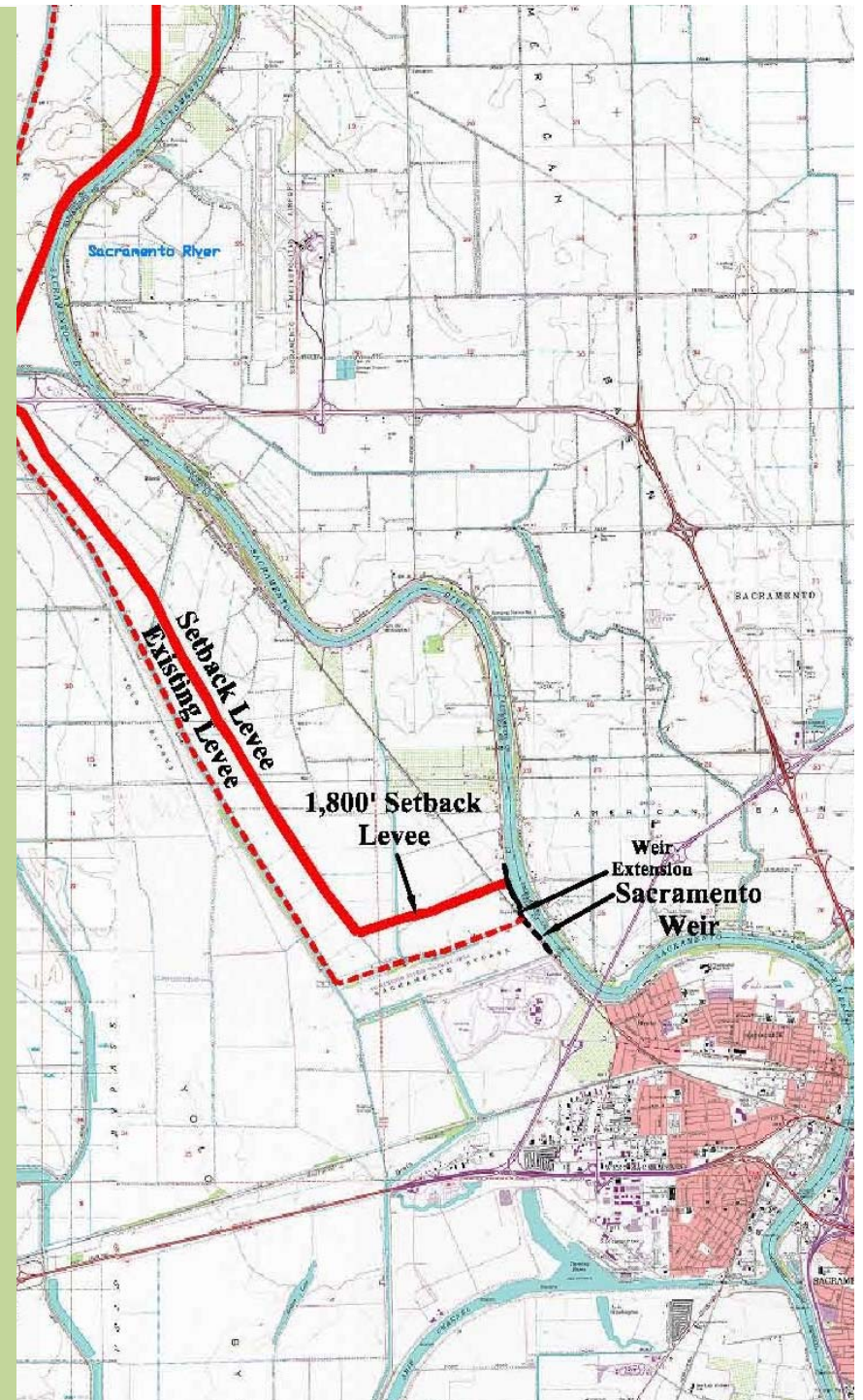
Lower Yolo Bypass Footprint Components

Degrade stair-step
levees at north end of
Liberty Island and Little
Holland Tract

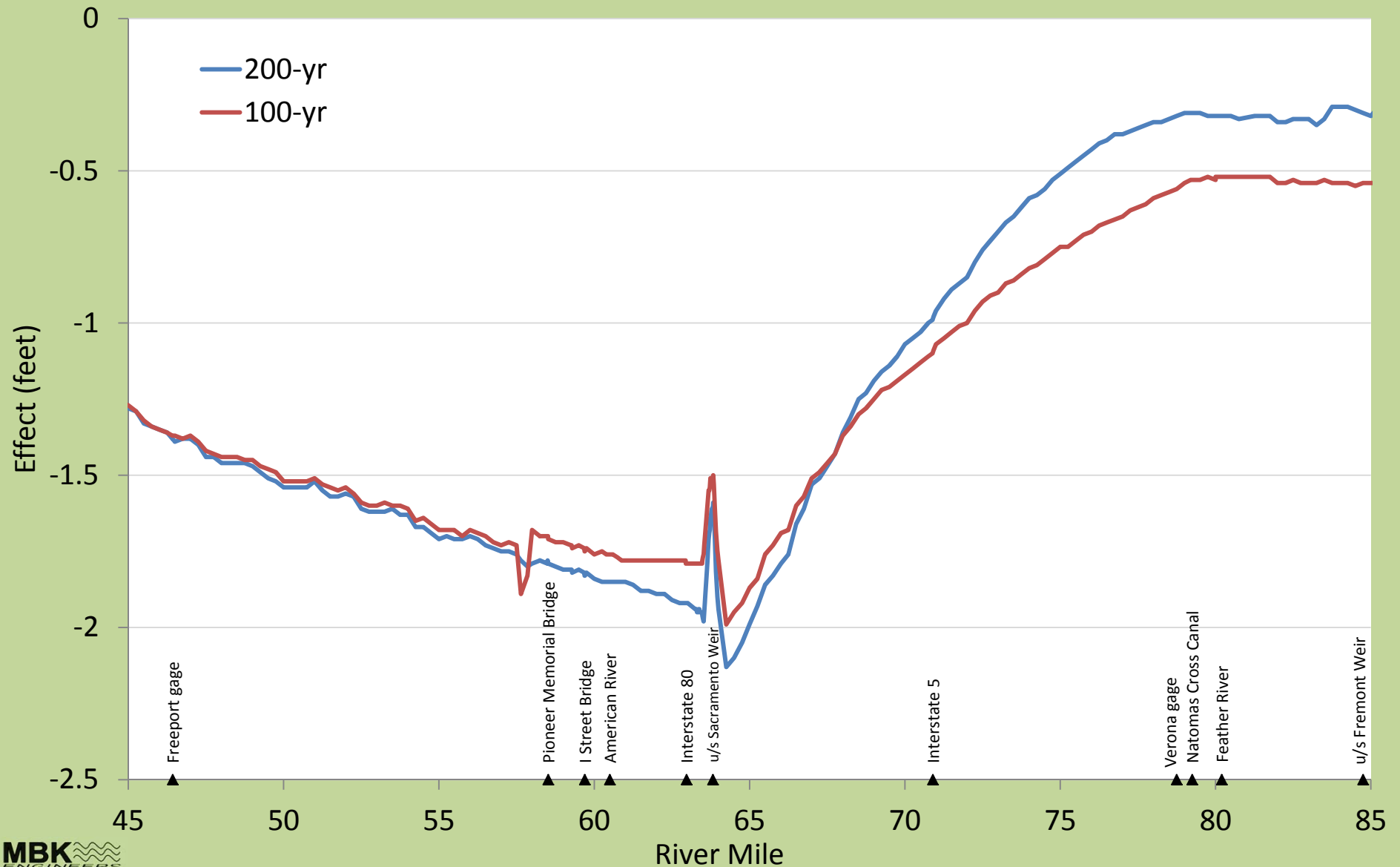
— hydraulic effect
minimal and isolated

Degrade levees in the
Lower Egbert Tract

Proposed Sacramento Bypass Widening and I-5 to Bypass East Yolo Bypass Levee Setback



Combined Effect on Sacramento River Water Surface Elevation (preliminary results)



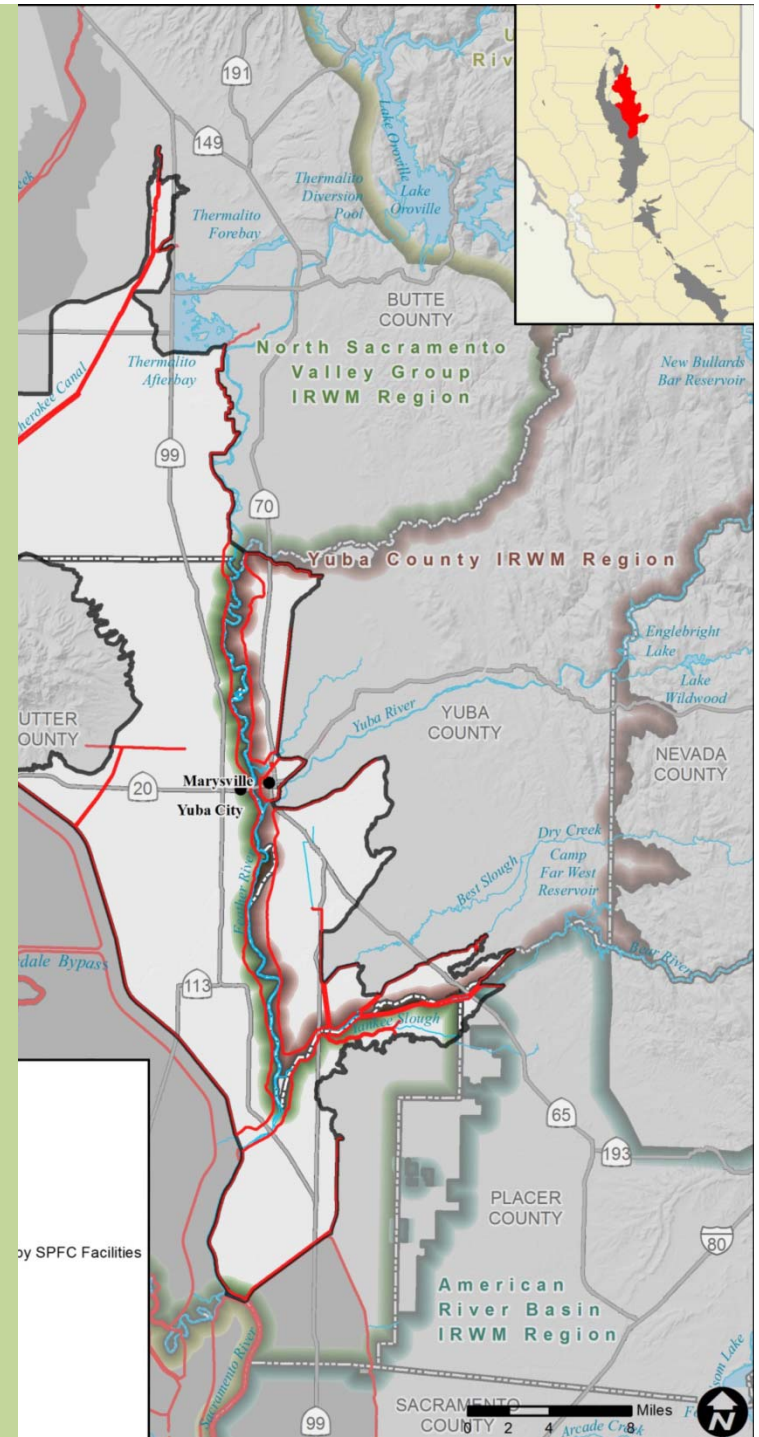
Feather River Regional Flood Management Plan

Urban Levee Improvements:

Marysville – 300 year +

RD 784 – 200 year+

Yuba City – 200 year+



Feather Region System Improvements

Oroville Dam Surcharge storage

Reoperation of Thermolito

Low Level Outlets at New Bullards Bar Dam

Flood-Coordinated Operations & Forecast-Based Operations

Transitory Storage – RD 784 Horseshoe Levee

Questions